PART 1 - GENERAL

1.1 Section Includes

- A. Work of this section includes, but is not limited to the following:
 - i. High performance concrete or composite core access floor system.
- ii. Perimeter fin tube enclosure, linear grille and integral dampers to provide both heating and cooling at perimeter.
 - iii. Manually operated swirl diffusers.
 - iv. Automatic swirl diffusers.
 - v. Modular plug and play wiring for 120 volt power distribution system.
 - vi. Factory applied hard finishes such as a high pressure laminate, stone and vinyl.
 - vii. Factory cutouts for diffusers and electrical boxes.

1.2 Related Sections

- A. Concrete sealer (by Division 3) shall be compatible with pedestal adhesive.
- B. Electrical contractor (Division 26) shall provide necessary material and labor to electrically connect the access floor to the building ground as per electrical code: one grounding point per 300 m2.
- C. Carpet (by Division 9).
- D. Air handling units, ductwork, thermostats, valves, piping and control wiring (by Division 23 HVAC).
- E. Home run feeds from electrical rooms to power distribution zone boxes (by Division 26 Electrical).

1.3 Environmental Conditions for Storage and Installation

A. Area to receive the access floor shall be enclosed and maintained at ambient temperature between 55° to 85° F, and at humidity level between 20% to 70% relative, and shall remain within these environmental limits throughout installation and occupancy. All floor panels shall be stored and maintained within these limits upon delivery to storage sites.

1.4 References

A. CISCA (Ceilings & Interior Systems Construction Association) - "Recommended Test Procedures for Access Floors" shall be used as a guideline when presenting load performance product information.



1.5 Performance Certification

- A. Product tests shall be witnessed and certified by independent engineering and testing laboratory with a minimum of five years experience testing access floor components in accordance with CISCA "Recommended Test Procedures for Access Floors". Access floor supplier shall carry a cash allowance of \$2500.00 for Design Load testing (1.8.2A) and Rolling Load testing (1.8.2.D) to be carried out by Intertek Testing Services Ltd. Panels shall be randomly selected from job site.
- B. For seismic zones 3, 4 and 5, provide access flooring capable of withstanding lateral seismic forces to requirements of latest edition and amendments of National Building Code and Local Building By- Laws. Submit data on earthquake resistance in the form of structural computations that have been signed and sealed by an independent professional engineer. Include structural computations, material properties and other information required for structural analysis and verifications that access flooring system will withstand loads indicated.

1.6 Quality Assurance

- A. Install access floor system using manufacturer's own forces or an accredited franchiser installer under the control and responsibility of the system manufacturer. Have a senior, qualified field representative on Site to direct the Work at all working times.
- B. Access floor panels and understructure shall be fabricated by a manufacturing facility that has demonstrated a successful 10-year track record of local installations of similar size and complexity.
- C. Include for minimum 16 hours per floor for commissioning assistance to mechanical and electrical contractors to ensure optimize performance of under air floor system. Include pressurization test equipment and smoke test to identify any air leakage issues.

1.7 Mock Up

A. Before installation of entire access floor system, provide a 2.4 m x 2.4 m (8' x 8') mock up of the floor system determined by Architect/Construction Manager which serves as the minimum standard for the remaining access floor system delivered to, and installed at the Site. Build such mock up where directed by Architect/Construction Manager. The mock up will be installed prior to issuing a contract to enable the owner and consultants to conduct a comparative review of products. Provide product binder with mock up containing all load testing and any other test data verifying compliance with spec.



1.8 Performance Requirements

1.8.1 Pedestals:

- A. **Axial Load**: Pedestal assembly shall provide a minimum 2272 kg (5000 lb.) axial load without permanent deformation.
- B. **Overturning Moment**: Pedestal assembly shall provide an average overturning moment of 112.98 Nm (1000 in-lbs.) when glued to a clean, sound, uncoated concrete surface. Structural calculations shall be required attesting to the lateral stability of the system under seismic conditions. Provide independent seismic certification from a Professional Engineer registered in the State or Province where the project is located.

1.8.2 Floor Panels:

- A. **Design Load**: Panel supported on system understructure shall be capable of supporting a minimum concentrated load of 5.6 KN (1250 lbs.) at any location on the panel. This rating signifies that the system will withstand the concentrated load without yielding and be capable of withstanding a minimum of 2 X the design load. Design and ultimate loads are applied to 1 square inch of the panel at the weakest point of the system.
- B. **Uniform Load**: Panel shall be capable of supporting a minimum uniform load of 21.5 kPa (450 lbs./sq.ft.) at any location on the panel with a maximum top surface deflection of 1.0 mm (0.040 inches). Panel shall not exceed a permanent set of .25 mm (0.010 inches), after the load is removed.
- C. **Safety Factor**: Panel supported on actual understructure (the system) shall be capable of withstanding a minimum of (2) two times the design load anywhere on the panel without failure. Failure is defined as the point at which the system will no longer accept the load.
- D. **Rolling Load**: Panel and supporting understructure shall be able to withstand the following rolling loads at any location on the panel without developing a local and overall surface deformation greater than 0.040 inches. Note: wheel 1 and wheel 2 tests shall be performed on two separate panels.

Wheel 1: Size: 3" dia x 1 13/16" wide Load: 568 kg (1250 lbs.) Passes: 10
Wheel 2: Size: 6" dia x 2" wide Load: 398 kg (875 lbs.) Passes: 10,000

- E. **Impact Load:** Panel and supporting understructure shall be capable of supporting an impact load of 57 kg (125 lbs.) dropped from a height of 1 meter (36 inches) onto a 25mm x 25mm area (1 sq. inch) at any location on the panel.
- F. **Flammability**: System (not including floor covering) shall meet the following flammability requirements when tested in accordance with ULC S102.1. Provide independent test reports as part of submittal. Provide building code approval documentation where necessary.

Flame Spread: 0 Smoke Development: <5 Class: 'A'

CAMINO MODULAR BUILDING SYSTEMS

G. **Environmental**: Provide low VOC emitting materials. Only non-toxic adhesives shall be used for fabrication and installation.

1.8.3 To be added as required for LEED projects

Environmental/LEED Certification: Floor system shall be manufactured with components to help secure the following LEED-NC Version 3credits:

EA P2: Minimum Energy Performance

EA C1: Optimize Energy Performance

MR C4: Recycled Content

MR C5: Regional Materials

IEQ P1: Minimum Indoor Air Quality Performance

IEQ C2: Increased Ventilation

IEQ C4.1: Low Emitting Materials, Adhesives and Sealants

IEO C6.2: Controllability of Systems – Thermal Comfort

IEO C7.1: Thermal Comfort

IEQ C7.2: Thermal Comfort – Verification

IEQ Credit 8.1 & 8.2: Daylight & Views

1.9 Design Requirements:

- A. Access floor system, where indicated on the design documents, shall consist of modular and removable steel clad panels with cementitious core supported by adjustable height pedestal assemblies.
- B. Panel shall be easily removed by one person with a lifting device and shall be interchangeable except where cut for special conditions.
- C. Quantities, finished floor heights (FFH) and location of accessories shall be as specified on the contract drawings.

1.9.1 Submittals for Review

- A. Detail sheets, for each proposed product type, which provide the necessary information to describe the product and its performance.
- B. Test reports, certified by an independent testing laboratory with a minimum of five years experience testing access floor components in accordance CISCA Recommended Test Procedures, certifying that component parts perform as specified.

1.9.2 Submittals for Information

- A. Manufacturer's installation instructions and guidelines.
- B. Manufacturer's Owner Manual outlining recommended care and maintenance procedures.



PART 2 - PRODUCTS

2.1 Support Components

Pedestals:

- A. Pedestal assemblies shall be corrosive resistant, all steel welded construction, and shall provide an adjustment range of +/- 1" for finished floor heights 6" or greater.
- B. Pedestal assemblies shall provide a means of leveling and locking the assembly at a selected height, which requires deliberate action to change height setting and prevents vibration displacement.
- C. Pedestal head shall be designed with locating tabs and integral shape to interface with the panel for positive lateral retention and positioning without fasteners. Pedestal head or bottom of panel corner shall be fabricated with integral sound deadening gasket.
- D. Hot dip galvanized steel pedestal head shall be welded to a threaded rod which includes a specially designed adjusting nut. The nut shall provide location lugs to engage the pedestal base assembly, such that deliberate action is required to change the height setting. Pedestal head shall be provided with steel tabs to provide lateral stability and act as a locator for panel positioning.
- E. Threaded rod shall provide a specially designed anti-rotation device, such that when the head assembly is engaged in the base assembly, the head cannot freely rotate (for FFH of 6" or greater).
- F. Hot dip galvanized pedestal base assembly shall consist of a formed steel plate with no less than 16 square inches of bearing area, welded to a 7/8" square steel tube and shall be designed to engage the head assembly.

2.2 Panel Components

Floor Panels:

- A. Panels shall consist of a galvanized steel sheet die formed to encase a cementitious or composite core material to meet load performance and fire rating performance criteria outlined in 1.8.2.
- B. Panel shall have a durable non-corrosive finish treatment to steel surfaces.
- C. Corner of panel shall have a locating tab and integral shape design to interface with the pedestal head for positive lateral retention and positioning with or without fasteners.
- D. Fastening of panels to pedestal heads shall be accomplished by the use of 4 machine screws per panel.



2.3 Accessories

2.3.1 Modular Wiring:

A. Floor Boxes:

CSA approved Power, Voice & Data (PVD) Service centers shall be provided in locations as detailed on the contract drawings. High capacity 9 inch diameter (224mm) Service centers shall be capable of accommodating up to four duplex receptacles, knockouts for standard voice/data faceplates and integral modular plug and play connectors. The service outlet box shall be a round drop-in design with heavy duty poly carbonate lid to match and be interchangeable with round swirl diffusers.

B. Power Distribution Zone Box:

CSA approved Power Distribution Zone Box (PDZB) with 9 or 12 modular 5 pin connector power out ports to provide general purpose and/or dedicated 120 volt power. The PDZB shall be constructed of cold rolled steel with painted powder coat finish and bolt on steel lid. Each PDZB shall have a label indicating the circuit number and electrical panel at each power out connector. Home run feeds from electrical panel to PDZB shall be by Division 26.

C. Plug and Play Cable Sets:

CSA approved modular cable sets shall be provided to connect flush mount PVD Servicenters to Power Distribution Zone Boxes. Metallic flex cable set to be manufactured with modular 5 pin connectors on each end and be CSA approved for plenum applications. Length to be 8 meters (25 ft) unless otherwise shown on drawings.

2.3.2 Diffusers and Perimeter Heat/Cool Linear Grille System:

A. Manual round diffusers (Type A): Circular diffusers shall be constructed of high strength polymer which complied with UL2043. Diffuser shall be designed for supply into the space with maximum air flow of 80 CFM at a plenum pressure of 0.05" W.G. Diffuser shall be 224 mm (9") diameter and be complete with dirt collection basket and manual adjusted flow regulator damper to allow user to control air flow. Diffuser shall have an integral thumb slider to enable easy adjustment of personal air flow requirements. Diffuser shall be capable



of installing without use of clamps or screws and without compromising ease of occupant use. Color to be chosen from manufacturer's standard range. Diffuser shall match look of electrical floor box and be interchangeable in some cut out hole. Diffuser shall have ability to add a low voltage actuator and internal set screw adjustment to increase output to 110 CFM at a plenum pressure of 0.05" W.G. Vertical projection of airflow at 0.25 metres/sec (50fpm) terminal velocity shall be 1200 - 1500 mm (48-60"). Horizontal spread to 0.25 metres/sec (50fpm) terminal velocity shall be 1500 - 1800 mm. (60 - 72"). Provide each floor diffuser with high induction diffuser, mounting ring and carpet flange, dirt/dust collection basket, and flow regulator. Maximum opening sizes shall not exceed 7.6 mm (1/4") for shoe heel penetration. Design grille to be capable of supporting 560 Kg (1232lbs). Ensure tight seal between floor and diffuser. Diffusers shall have integral air seal gasket to maintain air tightness in cut out panel.

- B. Thermostatically controlled round swirl diffusers with actuator (Type B): Circular swirl diffusers shall be constructed of high strength polymer which complied with UL2043. Diffuser shall be designed for VAV supply into the space with maximum air flow of 110 CFM at a plenum pressure of 0.05" W.G. Vertical projection of airflow at 0.25 metres/sec (50fpm) terminal velocity shall be 1200 – 1500 mm (48-60"). Horizontal spread to 0.25 metres/sec (50fpm) terminal velocity shall be 1500 – 1800 mm. (60 – 72") Diffuser shall be 224 mm (9") diameter and be complete with dirt collection basket and 24 VAC actuator capable of modulating with 0-10 VDC signal to control VAV damper. Design grille to be capable of supporting 560 Kg (1232lbs). Ensure tight seal between floor and diffuser. Diffusers shall have integral air seal gasket to maintain air tightness in cut out panel. Color from manufacturer's standard range. Actuator shall be designed for daisy chain connection of multiple diffusers using standard 12 foot or 20 foot modular plenum rated cables. A 120 VAC/24 VAC power supply module (PSM) is required for each zone thermostat. The diffuser and PSM are supplied and installed by this section. The zone thermostat, thermostat cable, 120 volt power and the low voltage interconnect daisy chain cables are provided by Division 23. (Controls Contractor) Diffuser to match manual diffuser and electrical floor boxes and be totally interchangeable in same cut out panel.
- C. Thermostatically controlled VAV Access Floor perimeter diffusers with actuator (Type C): Perimeter diffusers shall consist of three components, a sheet metal chassis, architectural aluminum diffuser grille and a motorized damper and actuator, together with power and



control terminations, factory assembled and tested. Unit chassis shall be minimum 18-gauge galvanized steel that shall enclose and support all components. Chassis construction shall admit plenum air from below the floor in one or more directions. Chassis shall not exceed 204 mm (8") in depth for perimeter floor terminals when measured from the top of the access floor surface. Design chassis such that dust and dirt falling through the grille is captured and collected for easy removal by vacuum cleaning. The Diffuser shall be designed for VAV supply into the space with maximum air flow of 180 CFM at a plenum pressure of 0.05" W.G. Diffuser shall be 204mm (8") by 408mm (16") and be complete with dirt collection basket and 24 VAC actuator capable of modulating with 0-10 VDC signal to control VAV damper. Grille Color from manufacturer's standard range and be either linear bar style or cast aluminum with directional grilles. Aluminum grille shall be designed to mix the air stream. Design the grille to provide a vertical airflow projection of 1.5 m (5ft) at a terminal velocity of 0.25 metres/sec (50fpm). Horizontal spread at the above condition shall not exceed 3.0 m (10ft). Unit shall be provided with a minimum position and shall not shut off, but retain 10-15% of maximum flow as a minimum position. Actuator shall be designed for daisy chain connection of multiple diffusers using standard 12 foot or 20 foot modular plenum rated cables. A 120 VAC/24 VAC power supply module (PSM) is required for each zone thermostat. The diffuser and PSM are supplied and installed by this section. The zone thermostat, thermostat cable, 120 volt power and the low voltage interconnect daisy chain cables are provided by Division 23. (Controls Contractor).

D. Provide modular prefabricated flush mount steel enclosure box for perimeter hot water fin tube heating and cooling system as detailed on drawings: Steel enclosure to be manufactured from 18 ga. galvanized steel and be supported by an adjustable steel pedestal and stringer system. Provide 9" wide continuous linear grille fabricated from aluminum, with pencil and heel proof spacing, to be supported by fin tube box and installed flush with adjacent access floor finish. Fin tube enclosure to be sealed at junction of access floor with caulking to ensure air tightness from pressurized plenum. Provide stiffening brackets and stack effect air divider plate as per detail on drawings. Grille finish to be chosen from manufacturer's standard range. Perimeter fin tube enclosure to include integral motorized damper located below the access floor.(Type C): VAV damper constructed of 18 ga. galvanized steel with an 18 ga. galvanized steel volume damper and be incorporated into the hot water fin tube enclosure. Heat and cool module shall be designed to mix the air stream and grille design to provide a vertical airflow projection of 1.5 m (5ft) at a terminal velocity



of 0.25 metres/sec (50fpm). Horizontal spread at the above condition shall not exceed 3.0 m (10ft) Units shall be designed for thermostatic VAV supply into the perimeter fin tube housing space with air flow of 45 CFM per linear foot into the occupant space at a plenum pressure of 0.05" W.G. Provide with 24 VAC actuator capable of modulating with 0-10 VDC signal. Actuator shall be designed to allow daisy chain connection of multiple dampers using standard low voltage plenum rated modular plug-in cables. Modular steel perimeter enclosure box may include radiant fin tube elements with BTU per performance output as shown on drawings/schedules. Power supply module (PSM) and 120 VAC power connection to the PSM is required for each zone thermostat. The fin tube enclosure, grille, radiant fin tubes, damper and PSM are supplied and installed by this section. The zone thermostat, thermostat cable, 120 volt power and the low voltage interconnect daisy chain cables are supplied and installed by Division 23. (Controls Contractor) Hot water control valves associated plumbing, pressure testing, and wiring for fin tube system by others. Any penetration into the fin tube enclosure for plumbing/piping are cut and sealed by the trade supplying the pipe.

E. Provide modular prefabricated flush mount steel enclosure box for interior cooling system as detailed on drawings: Steel enclosure to be manufactured from 18 ga. galvanized steel and be supported by an adjustable steel pedestal and stringer system. Provide 9" wide continuous linear grille fabricated from aluminum with pencil and heel proof spacing, to be supported by enclosure box and installed flush with adjacent access floor finish, length of unit as detailed on drawings. Enclosure to be sealed at junction of access floor with caulking to ensure air tightness from pressurized plenum. Grille finish to be chosen from manufacturer's standard range. Interior enclosure to include integral motorized damper located below the access floor. (Type C): VAV damper constructed of 18 ga. galvanized steel with an 18 ga. galvanized steel volume damper and be incorporated into enclosure. Interior cool module shall be designed to mix the air stream and grille design to provide a vertical airflow projection of 1.5 m (5ft) at a terminal velocity of 0.25 metres/sec (50fpm). Horizontal spread at the above condition shall not exceed 3.0 m (10ft) Units shall be designed for thermostatic VAV supply into the interior enclosure box and occupant space with air flow of 45 CFM per linear foot at a plenum pressure of 0.05" W.G. Provide with 24 VAC actuator capable of modulating with 0-10 VDC signal. Actuator shall be designed to allow daisy chain connection of multiple dampers using standard low voltage plenum rated modular plug-in cables. Power supply module (PSM) and 120 VAC power connection to the PSM is required for each zone thermostat. The enclosure, grille, damper and PSM are supplied and installed



by this section. The zone thermostat, thermostat cable, 120 volt power and the low voltage interconnect daisy chain cables are supplied and installed by Division 23. (Controls Contractor)

F. Designer Series Access Floor Perimeter Linear Grilles: Grilles to be constructed of 1/8" aluminum bars and have either 5/16" or 3/8" center spacing both being pencil and heel proof. The length shall be per requirement with typical length being 60" to suit curtain wall vertical mullions. Grille clips to be provided to secure grille and provide alignment for joining continuous grille sections together. All grilles shall be constructed of extruded aluminum 1/8"linear bars and heavy duty cross support bars at max 10" spacing. Grilles to be provided in either clear satin anodized or color match powder coat paint finish. Width of the grilles shall be per drawings in multiple of linear bar spacing. Grille detail variations may be required to suite client demand and would be reflected in shop drawing submittals.

2.3.3 Miscellaneous Accessories:

- A. Provide factory cutouts in access floor panels for all PVD Service centers, grommets and all diffusers. Provide field cut outs for any base building electrical or mechanical pipes.
- B. Provide manufacturer's standard gasket or caulking air sealant at all perimeter cut panels at walls, columns and building concrete curbs. Sealing of cutouts for electrical/mechanical pipes or sheet metal to be performed by the trade supply the electrical or mechanical component.
- C. Provide 100 spare floor panels, 200, spare pedestals and 400 spare screws used in the project for maintenance stock. Deliver to project in manufacture's standard packaging clearly marked with the contents.
- D. Provide 12 panel lifting devices.

2.4 Factory Applied Finishes

A. Finish the surface of floor panels with factory applied floor covering material as indicated on the contract drawings. The type, color and pattern shall be selected from manufacturer's standard. Provide bolted stringer understructure with air seal/gasket for any exposed concrete, vinyl or static dissipative laminate finishes.

2.5 Fabrication Tolerances

- A. Floor panel flatness measured on a diagonal: +/- 0.030"
- B. Floor panel flatness measured along edges: +/- 0.025"



C. Floor panel width or length of required size: +/- 0.015"
D. Floor panel squareness tolerance: +/- 0.015"

PART 3 - EXECUTION

3.1 Preparation

- A. Examine structural subfloor for unevenness, irregularities and dampness that would affect the quality and execution of the work. Do not proceed with installation until structural floor surfaces are level, clean, and dry as completed by others.
- B. Concrete sealers, if used, shall be identified and proven to be compatible with pedestal adhesive. Verify that adhesive achieves bond to slab before commencing work.
- C. Verify dimensions on contract drawings, including level of interfaces including abutting floor, ledges and doorsills.
- D. The General Contractor/Construction Manager shall provide clear access, dry clean subfloor area free of construction debris and other trades throughout installation of access floor system. Area to receive access floor shall be enclosed and be maintained at a temperature range of 55° to 85° F and a humidity range of 20% to 70% relative. Access floor panels must be stored in this environment at least 24 hours before installation begins.

3.2 Air Plenum Sealing and Air Leakage

3.2.1 Access Floor System

- .1 Access floor system contractor shall sufficiently seal the access floor system as required at following locations to maintain air tightness:
 - A. Access floor perimeter at wall junctions.
 - B. Columns and fire-rated wall assemblies.
 - C. Access Floor to curb connections.
- .2 All electrical, mechanical and drywall penetrations (including the sealing of the drywall that penetrates access floor) shall be sealed by others.
- .3 Air leakage associated with floor panel seams shall not exceed 0.03 CFM per lin. ft. at 0.05" W.G. with full spread adhesive and carpet tile installed.

3.2.2 General Contractor

.1 General Contractor/Construction Manager shall ensure drywall, electrical and mechanical subtrade responsibility for meeting following air tightness requirements:



- A. Before start of access floor system installation, all slab to slab walls in areas to receive access floors shall be sufficiently sealed at the junction of walls and slabs.
- B. All ductwork, conduit, cabling and piping penetrations through walls, plenum dividers, and slabs shall be sufficiently sealed.
- C. All utility penetrations cut into access floor cavity by other trades during and after completion of installation of access floor system shall be sufficiently sealed by trade responsible for cutting the penetration.
- D. Sequence construction and schedule trades to ensure:
 - i. Curtain wall is complete and building is sealed against weather and temperature issues before commencement of access floor installation.
 - ii. Environmental conditions for installation are maintained at 55° to 85°F and 20% to 70% per access floor product specification during installation to ensure expansion and contraction issues of the floor system are kept to a minimum.

3.3 Installation

- A. Pedestal locations shall be established from approved shop drawings so that mechanical and electrical work can be installed without interfering with pedestal installation.
- B. Installation of access floor shall be coordinated with other trades to maintain the integrity of the installed system. All traffic on access floor shall be controlled by access floor installer. No traffic but that of access floor installers shall be permitted on any floor area for 24 hours to allow the pedestal adhesive to set.
- C. Floor system and accessories shall be installed under the supervision of the manufacturer's authorized representative and according to manufacturer's recommendations
- D. No dust or debris producing operations by other trades shall be allowed in areas where access floor is being installed to ensure proper bonding of pedestals to subfloor.
- E. A clean subfloor shall be turned over to the access floor installer prior to commencement of the access floor installation. Access floor installer shall keep the subfloor clean as the installation progresses.
- F. Partially complete floors shall be braced against shifting to maintain the integrity of the installed system where required.
- G. Additional pedestals as needed shall support panels where floor is disrupted by columns, walls, and cutouts.
- H. Understructure shall be aligned such that all uncut panels are interchangeable and fit snugly but do not bind when placed in alternate positions.
- I. Finished floor shall be level, not varying more than 0.062" in 10 feet or 0.125" overall.
- J. Acceptance: General Contractor/Construction Manager shall accept floor in whole or in part prior to allowing use by other trades.

